Chair of IT Service Management, Development and Operations
TUM School of Computation, Information and Technology
Technical University of Munich

TLN

Master Thesis

Business Process Conformance Checking with Uncertainty

Within the large field of Process Mining (PM), conformance checking plays an important role. Conformance checking reveals process executions deviating from their expected behavior as described by process models. Many conformance checking techniques are described in the literature (e.g., [1]). Predictive process monitoring (PPM) [2] is an important sub-field of PM and concerns predicting next events, process outcomes, remaining execution times, etc. Machine learning (ML) techniques are the go-to techniques of PPM. Neural networks [3] (and some other ML models) permit calculating the (un)certainty of their predictions.

The objective of this thesis is to test whether the calculated (un)certainty when predicting next events, process outcomes, remaining execution times, etc. can be used as a measure for process execution conformance (or deviation). The question which of these prediction targets are most suitable will be investigated as well. Strong programming skills are a prerequisite for this thesis.

Contact

Every thesis starts with an exposé, where you shape the topic towards your interest (in consultation with us). If you're interested, please contact us as outlined at https://www.cs.cit.tum.de/en/isdo/teaching/theses/.

[1]: Carmona, J. et al. "Conformance Checking: Foundations, Milestones and Challenges". Lecture Notes in Business Information Processing, vol. 448 (2022)
[2]: Kratsch, W. et al. "Machine Learning in Business Process Monitoring: A Comparison of Deep Learning and Classical Approaches Used for Outcome Prediction". Business \& Information Systems Engineering, vol. 63, pp. 261-276 (2021)
[3]: Weytjens, H. and De Weerdt, J. "Learning Uncertainty with Artificial Neural Networks for Predictive Process Monitoring". Applied Soft Computing, vol. 125, 109134 (2022)